

Focus. . . Cost of Unintentional Injuries to Missouri Children

The patient abstract system indicates a total of 612,880 records for Missourians treated during 1997 in hospitals and outpatient facilities for the effects of injury and poisoning. Of that total, 39,412 (6 percent) were inpatient records, and 573,468 (94 percent) were emergency room or other outpatient records. Records for children under the age of 18 years comprised 195,719 (32 percent) of the total. Of the records for injured children, only 4,185 (2 percent) were records for inpatients, while 191,534 (98 percent) were records for outpatients. The number of patients is somewhat less than the number of records because some patients are readmitted or visit the emergency room more than once.

Injuries are classified in the patient abstract system on the basis of International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) E-codes. Use of E-codes designates the external cause, or mechanism (e.g.: falls, poisonings, burns) of the injury, as well as a judgment of intent. This includes whether the injury was believed to be unintentional, was the result of assault, was self-inflicted, or was of unknown or some other intent. For children under the age of 18 years, 184,760 (94 percent) of the records had E-codes for unintentional injuries. Inpatient and outpatient records for children with unintentional injuries numbered 3,402 (2 percent) and 181,358 (98 percent), respectively.

The patient abstract system also reports charges imposed by the hospital or outpatient facility. For the 4,185 records of children treated as inpatients, the sum of charges was \$54.2 million. Of this total, \$46 million (85 percent) of the charges were related to unintentional injuries (Table 1). For the 191,534 records of children treated as outpatients, the sum of charges was \$88.3 million. Of this total, \$81.4 million (92 percent) of the charges were related to unintentional injuries. Unintentional injuries accounted for more than ninety percent of both the numbers of injuries and the hospital charges for injury to children; therefore, the focus of this report is on those injuries reported as unintentional.

Of the 3,402 unintentional injury records for inpatients, 2,864 (84 percent) were related to just eight different mechanisms. Similarly, of the total 181,358 unintentional injury records for outpatients, 152,633 (84 percent) were due to the eight most frequent mechanisms of injury. Table 2 shows that injuries due to falls and being struck by or against an object or person accounted for about half of all the recorded injuries to children. Motor vehicle crashes ranked fourth after cutting and piercing injuries; however they caused about a third of the most serious injuries, as indicated by their number one ranking for inpatients. Falls also caused serious injury, and were the second most frequent cause of admissions for children. Over all, most of the injuries to children were less serious, as ninety-eight percent of the records were for outpatients.

The combined data from inpatients and outpatients, broken out by type of motor vehicle injury, indicate that 8,664 (54 percent) of motor vehicle injury records resulted from collisions involving two or more vehicles. Non-collision injuries (e.g.: loss of control of vehicle, injury while boarding or alighting) accounted for 3,354 (21 percent). Injuries to pedestrians accounted for 910 (6 percent) of the 16,020 inpatient and outpatient motor vehicle injury records. Pedalcycle injuries caused about half that many at 379 (2 percent).

The most frequent type of fall resulting in reported injury was falls from a higher level (e.g.: playground equipment, embankments, furniture, trees), which made up 27 percent of the total. Falls at the same level (e.g.: slipping, tripping, stumbling) comprised 20 percent of reported fall injuries. Falls on stairs or steps made up 8 percent, while falls resulting from collisions, pushing, or shoving by another person were 6 percent of the total falls. This latter group includes 2,348 (5 percent) records of falls in sports activities, while falls from playground equipment accounted for 3,842 (8 percent) of the total 50,802 inpatient and outpatient fall records.

Injury reports associated with sports and recreation from all mechanisms (e.g.: falls, being struck by or against an object or person, pedalcycles, submersion) totaled 28,234, or 15 percent of the recorded injuries to children, both outpatient and inpatient. (Of these 28,234 reported sports/recreation injuries, 98 percent were treated as outpatients.) The greatest percentage (44 percent) of the reported sports/recreation injuries were in the struck-by category (n=12,333). Other mechanisms of sports/recreation injuries were pedalcycles numbering 7,108 (25 percent), falls numbering 6,332 (22 percent), non-motor vehicle transportation injuries numbering 1,707 (6 percent), motor vehicle traffic injuries totaling 378 (1 percent), and injury as pedestrians not related to motor vehicles numbering 331 (1 percent). Forty-five children (0.2 percent) were injured in submersion or near drowning incidents related to sports or recreation.

The mean length of stay for children admitted for unintentional injury of all types was 4.8 days, with the total statewide being more than sixteen thousand days. Length of stay in outpatient facilities is almost always less than one day, and is not reported here. Inpatient charges for childhood unintentional injury totaled nearly \$46 million, with a mean of more than \$13 thousand per stay (Table 3). Despite the lower mean charge, total outpatient charges were higher than inpatient charges due to the much greater number of outpatient visits. Outpatient charges totaled \$81 million, or 63 percent of all charges.

Table 3 shows the charges assessed by hospitals and outpatient facilities as related to the most frequent causes of injury. Motor vehicle traffic injury stands out as the most costly type of injury, having a total charge of about \$32.5 million. The average charges for reported motor vehicle injuries, inpatients and outpatients combined, was \$2,033. This was nearly three times greater than the next higher average, that for poisonings, and nearly three times the mean charge for all injuries. The second most costly cause of injury was falls, with total charges of about \$28.5 million, and an overall mean of \$563. Falls ranked first in total charges for outpatients and second for inpatients. Though the average charge for falls was not high, the great number of falls contributed to their large overall cost.

Burns due to contact with hot objects or substances ranked third among causes for hospital treatment, but did not appear among the most frequent injuries treated in outpatient facilities. Of the total 3,068 reported burn injuries, 187 (6 percent) were treated as inpatients. The severity of the inpatient burn injuries is indicated by their high mean charge of \$13,015. Their mean inpatient length of stay was 6.8 days, compared to 4.8 days for all inpatient injuries.

Charges related to injuries associated with sports and recreation from all mechanisms (e.g.: being struck by or against an object or person, falls, pedalcycles) totaled \$20.1 million, or 16 percent of total charges for injuries to children, both outpatient and inpatient. (Of this \$20.1 million charge for sports/recreation injuries, 73 percent were outpatient charges.) The greatest percentage (32 percent) of the reported sports/recreation charges was in the struck-by category. Other mechanisms of sports/recreation injuries having high total charges were falls (24 percent), pedalcycle injuries (24 percent), and non-motor vehicle transportation injuries (13 percent).

In Missouri in 1997, hospitals and outpatient care facilities charged about \$127.4 million for treatment and care of unintentional childhood injuries. Motor vehicle injuries are among the most serious causes of unintentional injury because of the relatively high incidence as well as the severity, as indicated by the high mean charge for care. Records of injury due to falls are more than three times greater in number than motor vehicle injury records, but the total charge for falls injuries is twelve percent less than for motor vehicle injuries, indicating their lesser severity. About sixteen percent of the total charges for treatment of unintentional injuries to children were related to sports or recreation.

Injuries are the leading cause of death in the United States from the first year of life to age 44. Unintentional injury to children is a major source of medical costs as well as suffering and disability. Until recent years the incidence of injury to children has generally been taken for granted, with the assumption that they occur by chance and are therefore not preventable. But it is recognized now that the occurrence of injuries to children is largely determined by characteristics of the environment, personal behavior, and the products used in their work, play, recreation and travel. Most injuries can be prevented.

Table 1
Missouri Children Under 18 Treated for Injuries, 1997

Intent by Charges by Patient Status									
Intent	INPATIENTS			OUTPATIENTS			TOTAL		
	Charges (dollars)			Charges (dollars)			Charges (dollars)		
	Number	Mean	Sum	Number	Mean	Sum	Number	Mean	Sum
			(1,000s)			(1,000s)			(1,000s)
Unintentional	3,402	13,520	45,995	181,358	449	81,408	184,760	690	127,403
Assault	174	12,410	2,159	5,139	549	2,820	5,313	637	4,979
Self Inflicted	376	5,127	1,928	899	1,067	960	1,275	2,265	2,888
Undetermined & other	233	17,681	4,120	4,138	747	3,090	4,371	1,650	7,210
TOTAL	4,185	12,951	54,202	191,534	461	88,278	195,719	728	142,480

Table 2
Missouri Children Under 18 Treated for Unintentional Injuries, 1997
Major Causes by Patient Status

INPATIENTS			OUTPATIENTS			TOTAL		
Mechanism	Freq.	Percent of Total	Mechanism	Freq.	Percent of Total	Mechanism	Freq.	Percent of Total
Motor vehicle traffic	1,076	31.6	Fall	50,085	27.6	Fall	50,802	27.5
Fall	717	21.1	Struck by/against	38,705	21.3	Struck by/against	38,940	21.1
Struck by/against	235	6.9	Cut/pierce	17,266	9.5	Cut/pierce	17,358	9.4
Poisoning	229	6.7	Motor vehicle traffic	14,944	8.2	Motor vehicle traffic	16,020	8.7
Burn (hot object/subst.)	187	5.5	Overexertion	11,350	6.3	Overexertion	11,395	6.2
Transport(not MV)	161	4.7	Natural/envIRONm	9,918	5.5	Natural/envIRONm	10,038	5.4
Pedalcycle (not MV)	139	4.1	Pedalcycle (not MV)	6,969	3.8	Pedalcycle (not MV)	7,108	3.8
Natural/envIRONm	120	3.5	Poisoning	3,396	1.9	Poisoning	3,625	2.0
Other	538	15.8	Other	28,725	15.8	Other	29,474	16.0
TOTAL	3,402	100.0	TOTAL	181,358	100.0	TOTAL	184,760	100.0

Table 3		
Missouri Children Under 18 Treated for Unintentional Injuries, 1997		
Mechanism by Charge for Services by Patient Status		
<i>INPATIENTS</i>	<i>Charges (dollars)</i>	
<i>Mechanism</i>	<i>Mean</i>	<i>Sum</i> <i>(1,000s)</i>
Motor vehicle traffic	20,309	21,852
Fall	8,433	6,046
Burn (hot obj/subst)	13,015	2,434
Transport (not MV)	11,827	1,904
Struck by/against	6,619	1,556
Pedalcycle (not MV)	8,691	1,208
Poisoning	3,854	883
Natural/environm	5,609	673
Other	17,546	9,440
TOTAL	13,524	45,995
<i>OUTPATIENTS</i>	<i>Charges (dollars)</i>	
<i>Mechanism</i>	<i>Mean</i>	<i>Sum</i> <i>(1,000s)</i>
Fall	450	22,504
Struck by/against	376	14,548
Motor vehicle traffic	716	10,682
Cut/pierce	345	5,947
Overexertion	494	5,608
Pedalcycle (not MV)	511	3,560
Natural/environm	257	2,540
Poisoning	500	1,696
Other	499	14,324
TOTAL	450	81,408
<i>TOTAL</i>	<i>Charges (dollars)</i>	
<i>Mechanism</i>	<i>Mean</i>	<i>Sum</i> <i>(1,000s)</i>
Motor vehicle traffic	2,033	32,534

Fall	563	28,551
Struck by/against	414	16,104
Cut/pierce	385	6,676
Overexertion	521	5,939
Pedalcycle (not MV)	671	4,768
Natural/environm	321	3,213
Poisoning	712	2,578
Other	544	100,362
TOTAL	691	127,403

Provisional Vital Statistics for October 1998

Live births increased in October as 6,728 Missouri babies were born compared with 5,920 in October 1997. Cumulative births for the 10- and 12-month periods ending with October also show increases, although birth rate for January-October remained the same, 13.9 per 1,000 population.

Deaths increased slightly in October, but decreased for the cumulative 10- and 12-month periods ending with October. For January-October, deaths decreased by 2.4 percent from 45,650 to 44,545.

The **Natural increase** for Missouri in October was 2,298 (6,728 births minus 4,430 deaths). The natural increase rose for all three time periods shown below.

Marriages increased in October, but decreased for the cumulative 10- and 12-month periods ending with October.

Dissolutions of marriage decreased in October, but increased for the 10- and 12-month periods ending with October. The marriage to divorce ratio decreased from 1.75 to 1.66 for the 12 months ending with October.

Infant deaths decreased in October, but increased for the cumulative 10- and 12-month periods ending with October. The infant death rate for January-October increased from 7.8 to 8.1 per 1,000 live births.

PROVISIONAL RESIDENT VITAL STATISTICS FOR THE STATE OF MISSOURI

Item	October				Jan. Oct. cumulative				12 months ending with October				
	Number		Rate*		Number		Rate*		Number		Rate*		
	<u>1997</u>	<u>1998</u>	<u>1997</u>	<u>1998</u>	<u>1997</u>	<u>1998</u>	<u>1997</u>	<u>1998</u>	<u>1997</u>	<u>1998</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>
Live Births	5,920	6,728	13.3	15.6	62,233	62,716	13.9	13.9	71,695	75,064	13.9	13.3	13.8
Deaths	4,385	4,430	9.9	10.2	45,650	44,545	10.2	9.9	54,477	53,733	10.1	10.1	9.9
Natural increase	1,535	2,298	3.5	5.3	16,583	18,171	3.7	4.0	17,218	21,331	3.8	3.2	3.9
Marriages	4,184	4,522	9.4	10.5	38,150	36,910	8.5	8.2	44,483	42,572	8.3	8.2	7.8
Dissolutions	2,268	2,078	5.1	4.8	21,355	21,442	4.8	4.8	25,483	25,707	4.8	4.7	4.7
Infant deaths	58	48	9.8	7.1	483	508	7.8	8.1	581	593	7.6	8.1	7.9
Population base (in thousands)	...	...	5,402	5,440	...	...	5,402	5,440	...	...	5,358	5,395	5,433

*Rates for live births, deaths, natural increase, marriages and dissolutions are computed on the number per 1000 estimated population. The infant death rate is based on the number of infant deaths per 1000 live births. Rates are adjusted to account for varying lengths of monthly reporting periods.

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